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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/198,849 11/24/98 KANEYAMA

Y P/1929-47

EXAMINER

IM22/1010

OSTROLENK FABER GERB AND SOFFEN
1180 AVENUE OF THE AMERICAS
NEW YORK NY 10036-8403

ELVE, M

ART UNIT

PAPER NUMBER

1725

DATE MAILED:

10/10/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/198,849

Applicant(s)

Kaneyama

Examiner

M. Alexandra Elve

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION:

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jul 13, 2001
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-19, 21, 22, and 25-50 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-19, 21, 22, and 25-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10-19, 21-22 & 25-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP(I) (197112 Abstract) in view of Sliwa, Jr. (US Pat. 4,990,462) and Sherry (US Pat. 4,763,829).

JP(I) discloses a mounting method in which a eutectic alloy solder is used to join semiconductor elements to a substrate whereby the soldering is conducted while immersed in an inactive liquid (vapor), thus eliminating oxidation effects JP(I) does not teach the joining of optical devices, semiconductor or ceramic substrates, printed circuit boards, electrodes, the use of ultrasonic vibration, the breaking of surface oxides or specifically the use of a liquid media.

Sliwa, Jr. discloses the use of liquid surface tension to aid in assembly of integrated circuits, optoelectronic devices, with ceramic and semiconductor substrates (abstract; col. 21-22, lines 66-68 & 1-5 and col. 23, lines 16-26). Additionally, it is noted that the one of key mechanisms of the liquid with respect to assembly are the ability of the liquid to render mating segments coplanar in preparation for joining. This is done by a configuration which seeks the

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minimum surface tension (col. 13, lines 33-47). The liquid agent helps control the assembly action forces acting on the segments via. surface tension and viscosity selection to minimize mechanical damage (col. 16, lines 40-68). Flotation liquids may be water, methyl or iso-proryl alcohol, molten indium or other low melting point metals and so forth (col. 18, lines 65-69).

The mother substrate may be a semiconductor, metal or insulation material such as glass or ceramic and may disposed on its surface any desirable combination of receptacle segments and conventional hybrid-style components and interconnects (col. 23, lines 16-21). Additionally, conventional solder bumps are shown on flip-chips (col. 23, lines 42-45).

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute liquid, as taught by Sliwa, Jr., for the JP(I) vapor because they are functional equivalents in terms of carrier media.

It would have been obvious to one or ordinary skill in the art to use semiconductors, optical devices, semiconductor or ceramic substrates, printed circuit boards and electrodes as taught by Sliwa, Jr. because these are merely varieties of semiconductor elements and substrates as used by JP(I).

Sherry discloses a technique for providing solder bumps to electronic components, such as silicon chips, chip carriers and circuit boards. Solder is applied to the surface along with ultrasonic energy so that the solder wets thoroughly (abstract). That is, a wafer is dipped into solder and at the same time ultrasonic energy is applied to the solder by a commercially available ultrasonic horn (col. 3, lines 4-13). The ultrasonic energy serves to break down the surface tension of the

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solder, thus permitting the solder to penetrate the openings in the mask and wet the exposed pads. Ultrasonic energy also aids in breaking up any oxide on the pad surfaces, thus eliminating the need for a fluxing operation (col. 3, lines 15-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use ultrasonic energy for solder bonding as taught by Sherry to the JP(I) soldering operation because it ensures the integrity of the solder joint.

Response to Amendment

3. Upon carefully reviewing Applicant's arguments filed July 13, 2001 the Examiner acknowledges the cancellation of claims 1-9, 20 & 23-24, the amendments to claim 10 and the addition of claims 27-50.

4. Applicant's arguments filed July 13, 2001 (paper # 14) have been fully considered but they are not persuasive.

Applicant argues that JP(I) discloses dipping the semiconductor into the vapor and hence differs from instant claims. The examiner respectfully disagrees because JP(I) states that the mounting method uses a eutectic system solder for semiconductor elements whereby the supporting eutectic alloy is immersed in an inactive solvent and the elements are joined to the substrate.

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The applicant argues that the vapor does not support the structure buoyantly. The examiner respectfully notes that Sliwa, Jr., teaches the use of a liquid. Additionally, the 35 USC 103 claim rejections were based on a combination of art, that is, instant claims were unpatentable over JP(I) (197112 Abstract) in view of Sliwa, Jr. and Sherry. Unobviousness cannot be established by attacking the references individually when the rejection is based on a combination of references. In re Novak 16 USPQ 2d 2041, 2043 (Fed. Cir., BPAI 1989); In re Merck & Co. 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986); In re Keller 208 USPQ 871 (CCPA 1981); *Ex parte Varga* 189 USPQ 204; *Ex parte Campbell* 172 USPQ 91; In re Scheckler 168 USPQ 716 (CCPA 1971); In re Young 159 USPQ 725; In re Lyons 150 USPQ 741.

Applicant argues that there is no mention of centering the device with the substrate. Mounting and hence centering of a device to a substrate is an inherent objective in mounting technology. If a device is not correctly mounted (centered) it will not operate, that is, it will be defective. This counter to device manufacturing objectives.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP(II) (3060134A, Abstract) & JP(III) (16902, Abstract).

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is (703) 308-0092. The examiner can normally be reached Monday to Friday from 6:30 AM to 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn, can be reached on (703) 308-3318. The fax number for the group is (703) 872-9386.

Any inquiry of general nature to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (703) 308-0661.



**M. ALEXANDRA ELVE
PRIMARY EXAMINER**

October 5, 2001.